

IN THE CLAIMS

Claims 21-51 are pending in this application. Please amend claims 21, 31 and 37 as follows:

1-20. (Cancelled)

21. (Currently Amended) A storage control device, comprising:

a channel adapter operatively coupled to a computer, to provide upper logical volumes for the computer and to receive data sent from the computer to the upper logical volumes;

a memory operatively coupled to the channel adapter to store the data sent from the computer and configuration information with respect to a configuration of the storage control device;

a disk adapter operatively coupled to the channel adapter and the memory to control reading and writing of the data from/to the memory and to provide inner logical volumes at least one of which is mapped to one of the upper logical volumes, the inner logical volumes being used as storing regions for transmission and reception of the data between the channel adapter and the disk adapter; and

a plurality of disk drives operatively coupled to the disk adapter, in which the data sent from the computer are written by control of the disk adapter as a data group,

wherein a first inner logical volume of the inner logical volumes is mapped to a first upper logical volume of the upper logical volumes and is mapped to a first set of disk drives in the plurality of disk drives, a first data group targeted to the first inner logical volume being written into the first set of disk drives,

wherein a second upper logical volume of the upper logical volumes is operatively coupled to control the storage control device and is utilized when the configuration information in the memory is read by the computer,

wherein the channel adapter receives a command including a change-over instruction from the computer to be stored in the second upper logical volume, the change-over instruction including information identifying a second inner logical volume of the inner logical volumes to be mapped to the first upper logical volume,

wherein the channel adapter maps the second inner logical volume instead of the first inner logical volume to the first upper logical volume in response to the

change-over instruction stored in the second upper logical volume, and the channel adapter further operates to start a second set of disk drives from the plurality of disk drives that are mapped to the second inner logical volume, [[and]]

wherein activation of the second set of disk drives that are mapped to the second inner logical volume starts in response to change-over from the first inner logical volume to the second inner logical volume,

wherein the storage control device is configured to change over an inner logical volume mapped to the first upper logical volume from the first inner logical volume to the second inner logical volume in response to an instruction which is different from a data reading or writing instruction from the computer coupled to the channel adapter, and.

wherein, with regard to the plurality of disk drives mapping to the first inner logical volume, the storage control device is configured to check whether or not an other inner logical volume are mapped to an error check and correction (ECC) group concerning the plurality of disk drives in response to change-over from the first inner logical volume to the second inner logical volume, and then if the other inner logical volume are not mapped to the ECC group then the activation of the plurality of disk drives stops.

22. (Previously Presented) The storage control device as set forth in claim 21, wherein the channel adapter operates to stop driving the first set of disk drives in the plurality of disk drives mapped to the first inner logical volume in response to the change-over instruction.
23. (Previously Presented) The storage control device as set forth in claim 21, wherein the channel adapter judges whether spindle motors of the second set of disk drives mapped to the second inner logical volume are being operated or not, and if the spindle motors of the second set of disk drives are being operated, the channel adapter keeps an operation of the spindle motors of the second set of the disk drives to be continued, and if the spindle motors of the second set of the disk drives are not operated, the channel adapter operates to start the spindle motors of the second set of the disk drives.

24. (Previously Presented) The storage control device as set forth in claim 21, wherein if the first set of disk drives mapped to the first inner logical volume is also mapped to an another inner logical volume of the plurality of inner logical volumes, the channel adapter keeps operation of spindle motors of the first set of disk drives continuing even if the first inner logical volume is unmapped from the first upper logical volume in response to the change-over instruction.
25. (Previously Presented) The storage control device as set forth in clam 21, wherein if the first set of disk drives mapped to the first inner logical volume is not mapped to another inner logical volume of the plurality of inner logical volumes, the channel adapter operates to stop spindle motors of the first set of disk drives if the first inner logical volume is unmapped from the first upper logical volume in response to the change-over instruction.
26. (Previously Presented) The storage control device as set forth in claim 21, wherein a second command sent from the computer to the second upper logical volume is a write command, the channel adapter judges that a content of the write command includes the change-over instruction.
27. (Previously Presented) The storage control device as set forth in claim 21, wherein a second command sent from the computer to the second upper logical volume is a read command, the channel adapter judges that an object of the read command is the configuration information, reads the configuration information from the memory, and sends the configuration information to the computer.
28. (Previously Presented) The storage control device as set forth in claim 21, further comprising:
a power control device, wherein in response to an indication from the channel adapter, the power control device stops supplying power to spindle motors of the first set of disk drives, and the power control device operates to supply power to spindle motors of the second set of disk drives.

29. (Previously Presented) The storage control device as set forth in claim 21, wherein a second command sent from the computer is addressed to the first upper logical volume, the channel adapter judges that the second command sent from the computer is a command concerning writing or reading of the data, and if the second command sent from the computer is addressed to the second upper logical volume, the channel adapter judges that the second command sent from the computer is a command concerning the control information.
30. (Previously Presented) The storage control device as set forth in claim 21, wherein a first content of the first data group stored in the first inner logical volume is different from a second content of a second data group stored in the second inner logical volume.
31. (Currently Amended) A storage system coupled to a computer, comprising:
an interface coupled to the computer;
a plurality of disk drives;
a plurality of upper volumes for the computer; and
a plurality of inner volumes which are mapped to the plurality of disk drives,
wherein a first upper volume of the plurality of upper volumes is mapped to a first inner volume of the plurality of inner volumes so as to access the first inner volume by the computer,
wherein, in response to receiving an access command at the interface from the computer for accessing the first upper volume of the plurality of upper volumes, the first inner volume mapped to the first upper volume is accessed by the computer via the first upper volume, [[and]]
wherein the first upper volume is mapped to a second inner volume of the plurality of inner volumes instead of the first inner volume in response to receiving an instruction from the computer to assign the second inner volume to the first upper volume such that the second inner volume is accessed by the computer via the first upper volume in response to receiving the access command at the interface for accessing the first upper volume, [[and]]

wherein activation of disk drives that are mapped to the second inner logical volume starts in response to change-over from the first inner logical volume to the second inner logical volume,

wherein the storage control device is configured to change over an inner logical volume mapped to the first upper logical volume from the first inner logical volume to the second inner logical volume in response to an instruction which is different from a data reading or writing instruction from the computer coupled to the channel adapter, and

wherein, with regard to the plurality of disk drives mapping to the first inner logical volume, the storage control device is configured to check whether or not an other inner logical volume are mapped to an error check and correction (ECC) group concerning the plurality of disk drives in response to change-over from the first inner logical volume to the second inner logical volume, and then if the other inner logical volume are not mapped to the ECC group then the activation of the plurality of disk drives stops.

32. (Previously Presented) A storage system according to claim 31, wherein a first group of disk drives of the plurality of disk drives mapped to the first inner volume is stopped in response to receiving the instruction from the computer to assign the second inner volume to the first upper volume instead of the first inner volume.
33. (Previously Presented) A storage system according to claim 32, wherein a second group of disk drives of the plurality of disk drives mapped to the second inner volume is started in response to receiving the instruction from the computer to assign the second inner volume to the first upper volume if the second group of disk drives is not operated.
34. (Previously Presented) A storage system according to claim 33, wherein the first group of disk group is kept operating even if the first inner volume is unmapped from the first upper volume in response to the instruction from the computer if the first group of disk group is mapped to an another inner volume of the plurality of inner volumes.

35. (Previously Presented) A storage system according to claim 31, wherein the second upper volume receives the instruction as a write command.
36. (Previously Presented) A storage system according to claim 35, wherein the first inner volume stores a first content which is sent by the computer during a first period before receiving the instruction, and
wherein the second inner volume stores a second content which is sent by the computer during a second period after receiving the instruction.
37. (Currently Amended) A storage control system operatively coupled to an external device, comprising:
a channel adaptor operatively coupled to the external device and configured to provide access to and from a plurality of upper logical volumes;
a memory operatively coupled to the channel adaptor to store at least configuration information for configuration of the storage control system;
a disk adaptor operatively coupled to the channel adaptor and the memory to control reading and writing of the data from/to the memory and to provide a plurality of inner logical volumes being used to store data for transmission and reception between the channel adapter and the disk adaptor; and
a plurality of disk drives operatively coupled to the disk adaptor, wherein
a first inner logical volume of the inner logical volumes is mapped to a first upper logical volume of the upper logical volumes and is mapped to a first set of disk drives of the plurality of disk drives, wherein
a second upper logical volume of the upper logical volumes is configured to receive a change-over instruction from the external device,
the channel adaptor is configured to receive the change-over instruction by using the second upper logical volume, the change-over instruction including information identifying a second inner logical volume of the plurality of inner logical volumes to be mapped to the first upper logical volume,
the channel adaptor is configured to map the second inner logical volume instead of the first inner logical volume to the first upper logical volume in response to the change-over instruction received at the second upper logical volume, [[and]]

the disk adaptor is further configured to operate a second set of disk drives of the plurality of disk drives that are mapped to the second inner logical volume after that the first upper logical volume is mapped to the second inner logical volume instead of the first inner logical volume, [[and]]

[[wherein]] activation of the second set of disk drives that are mapped to the second inner logical volume starts in response to change-over from the first inner logical volume to the second inner logical volume,

the storage control device is configured to change over an inner logical volume mapped to the first upper logical volume from the first inner logical volume to the second inner logical volume in response to an instruction which is different from a data reading or writing instruction from the computer coupled to the channel adapter, and

with regard to the plurality of disk drives mapping to the first inner logical volume, the storage control device is configured to check whether or not an other inner logical volume are mapped to an error check and correction (ECC) group concerning the plurality of disk drives in response to change-over from the first inner logical volume to the second inner logical volume, and then if the other inner logical volume are not mapped to the ECC group then the activation of the plurality of disk drives stops.

38. (Previously Presented) A storage control system according to claim 37, wherein the channel adapter operates to stop driving the first set of disk drives in the plurality of disk drives mapped to the first inner logical volume in response to the change-over instruction.
39. (Previously Presented) A storage control system according to claim 37, wherein the channel adapter judges whether spindle motors of the second set of disk drives mapped to the second inner logical volume are being operated or not, and if the spindle motors of the second set of disk drives are being operated, the channel adapter keeps an operation of the spindle motors of the second set of the disk drives to be continued, and if the spindle motors of the second set of the disk drives are not operated, the channel adapter operates to start the spindle motors of the second set of the disk drives.

40. (Previously Presented) A storage control system according to claim 37, wherein if the first set of disk drives mapped to the first inner logical volume is also mapped to another inner logical volume of the plurality of inner logical volumes, the channel adapter keeps operation of spindle motors of the first set of disk drives continuing even if the first inner logical volume is unmapped from the first upper logical volume in response to the change-over instruction.
41. (Previously Presented) A storage control system according to claim 37, wherein if the first set of disk drives mapped to the first inner logical volume is not mapped to another inner logical volume of the plurality of inner logical volumes, the channel adapter operates to stop spindle motors of the first set of disk drives if the first inner logical volume is unmapped from the first upper logical volume in response to the change-over instruction.
42. (Previously Presented) A storage control system according to claim 37, wherein a second command sent from the computer to the second upper logical volume is a write command, the channel adapter judges that a content of the write command includes the change-over instruction.
43. (Previously Presented) A storage control system according to claim 37, wherein a second command sent from the computer to the second upper logical volume is a read command, the channel adapter judges that an object of the read command is the configuration information, reads the configuration information from the memory, and sends the configuration information to the computer.
44. (Previously Presented) A storage control system according to claim 37, further comprising:
a power control device, wherein in response to an indication from the channel adapter, the power control device stops supplying power to spindle motors of the first set of disk drives, and the power control device operates to supply power to spindle motors of the second set of disk drives.

45. (Previously Presented) A storage control system according to claim 37, wherein a second command sent from the computer is addressed to the first upper logical volume, the channel adapter judges that the second command sent from the computer is a command concerning writing or reading of the data, and if the second command sent from the computer is addressed to the second upper logical volume, the channel adapter judges that the second command sent from the computer is a command concerning the control information.
46. (Previously Presented) A storage control system according to claim 37, wherein a first content of the first data group stored in the first inner logical volume is different from a second content of a second data group stored in the second inner logical volume.
47. (Previously Presented) A storage control system according to claim 37, wherein a first group of disk drives of the plurality of disk drives mapped to the first inner volume is stopped in response to receiving the instruction from the computer to assign the second inner volume to the first upper volume instead of the first inner volume.
48. (Previously Presented) A storage control system according to claim 47, wherein a second group of disk drives of the plurality of disk drives mapped to the second inner volume is started in response to receiving the instruction from the computer to assign the second inner volume to the first upper volume if the second group of disk drives is not operated.
49. (Previously Presented) A storage control system according to claim 48, wherein the first group of disk group is kept operating even if the first inner volume is unmapped from the first upper volume in response to the instruction from the computer if the first group of disk group is mapped to an another inner volume of the plurality of inner volumes.
50. (Previously Presented) A storage control system according to claim 37, wherein the second upper volume receives the instruction as a write command.

51. (Previously Presented) A storage control system according to claim 50, wherein the first inner volume stores a first content which is sent by the computer during a first period before receiving the instruction, and
- wherein the second inner volume stores a second content which is sent by the computer during a second period after receiving the instruction.